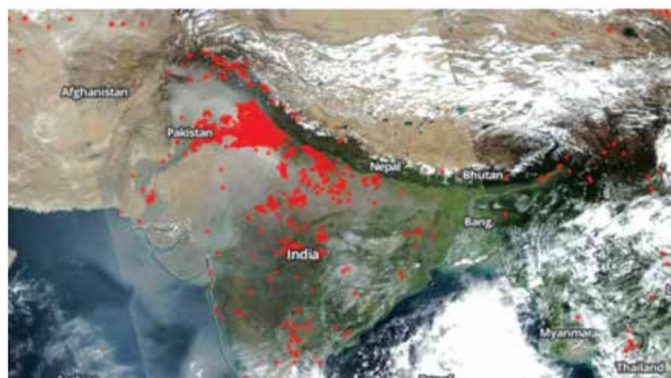




Value chain and policy interventions to accelerate zero-till adoption across the Indo-Gangetic Plains

Overview

Agricultural farming systems across the Indo-Gangetic Plains (IGP) have seen significant productivity growth at the expense of declining factor productivity, reduced soil organic matter, groundwater depletion, and degraded natural resources. More recently, in the north-west region of India in particular the smoke from burning of residue rice stubble (in the west) and wheat straw (in the east) is resulting in serious human health concerns. Stubble burning, combined with the traditional practice of tillage prior to crop establishment has a detrimental impact on soil health and quality.



NASA Satellite images taken on November 3, 2016 highlight the intensity of rice stubble residue burning (shown by red shading) across north-west India (credit NAAS, 2017).

The development of Conservation Agriculture (CA) practices, characterised by the direct sowing of crop into standing (retained) stubble, is termed Zero-Till (ZT) and provides a real alternative to traditional farming techniques. The Happy Seeder (HS), which was developed by scientists from CSIRO (Commonwealth Scientific and Industrial Research Organisation) and Punjab Agricultural University, has been developed specifically for the intensive rice-wheat cropping system of the Indo-Gangetic Plains. Happy Seeder is a tractor-mounted machine

that cuts and lifts the standing paddy stubble, drills the seeds of wheat crop in the soil and deposits the straw over the sown area as a mulch cover, thereby preventing the need to burn the stubble.

Research objectives

The research has focused on addressing the following objectives:

- Understand the full range of stakeholder contexts associated with accelerated ZT seed drill adoption in each of the targeted states/regions.
- Improve knowledge and understanding of private sector and farmer constraints to zero-tillage technology adoption, and opportunities for supporting accelerated adoption of ZT seed drills.
- Inform policy makers and private sector to help create a conducive environment for the accelerated adoption of ZT seed drills for CA based sustainable intensification.



A farmer with his Happy Seeder machine

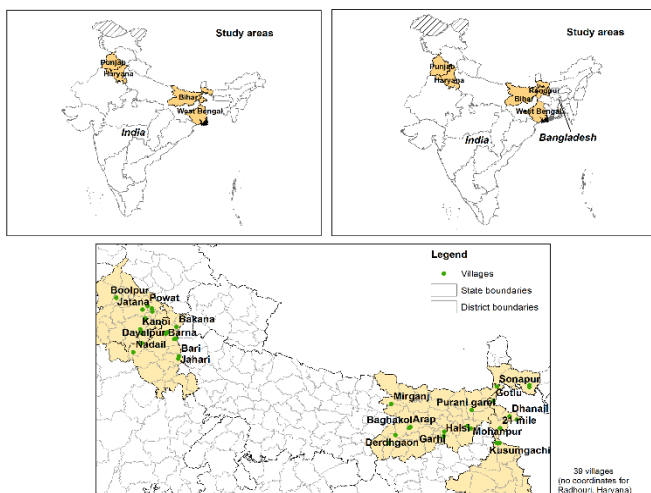
Methodology

The project aims and objectives have been addressed through adoption of three exploratory research

phases. The first phase involved a value-chain analyses approach to identifying suitable stakeholder information within each of the Gangetic plain regions of interest and collecting randomised data through the application of a farm household survey, focus group and structured interview techniques. The second phase involved application of mixed methods approach to data analyses using both qualitative and quantitative methods to isolate critical supply and demand factors, including financial analyses of different business models for farmers and service providers, constituting constraints to, and opportunities for, increased farmer adoption of the HS technology. The final phase involved a two-step process. Firstly, an initial workshop to test the project findings with expert working group members who will formulate tangible policy-guiding recommendations. Secondly, the presentation of these tested findings at a series of three ZT Summit Workshops to key government policy makers and stakeholders in support of influencing plans and procedures the lead to accelerated ZT seed drill adoption and more effective value chains in each region.

Data analyses

Data for the value chain analyses was collected through personal interviews with relevant stakeholders. The survey consisted of questions that enabled the gathering of views on the advantages of HS/ZT technology, challenges within and along the chain, any barriers faced by each stakeholder, breaks or failures in the current chain, and any recommendations from stakeholders on measures to effectively deal with these challenges.



Focus regions of data collection

The farm household survey was conducted in 400 households in India and 100 households in Bangladesh to identify current production and stubble management practices amongst the farmers.

Analyses and insights gained from the value chain interviews and farm household surveys indicate that there are significant barriers and challenges in the process of accelerated HS/ZT technology adoption as a possible solution to these issues. There is a need to re-evaluate the subsidy allocation presently offered, and to identify alternative policy/program options in support of accelerated adoption outcomes. The involvement of multiple stakeholders at the national and state level in India makes policy formation and implementation a complex process. However, the further success of the Happy Seeder technology and its adoption can be ensured through efficient collaboration with all the agencies involved at the national and state level including academic institutions, financial institutions, NGOs and most importantly the manufacturers of Happy Seeder and Zero-Till machines. More than anything, changing the mindset of farmers to make them aware of long-term environmental implications of stubble burning will pave the way for growth and uptake of this technology.

Policy and investment priorities

At the heart of this project is the policy initiative, which highlights the need for one consistent and long-term government policy to address climate management, straw burning issues and transitioning farmers toward conservation agriculture, and sustainable intensification; that is, zero-burn from zero-till. The proposed policy will create win-win outcomes, and must encompass the manufacturing sector right through to support/operation of machinery in the field over a longer-term (a 5-10 year period for achieving desired change).

In Bangladesh, there is the opportunity to link this policy initiative to current Prime Ministerial objectives of water saving technologies and the misuse of water, improved farm economics, and poverty reduction. In India current objectives to double farm income by 2022, in-situ technology payment support programs targeting custom hire centres (CHCs); natural resource, climate change and air pollution management priorities; and recommendations to address stakeholder concerns

about residue management also link neatly with the central messages of the policy brief. However, ZT/HS is the ONLY technology that can assist IGP farmers to address their issues as a whole. With these principles and broader objectives in mind, a set of four pillars are proposed to structure the policy initiative, and its implementation:

1. Better Awareness and Sustainable Entrepreneurial CHC businesses as a First Step to Adoption

2. Achieving a Vibrant Manufacturing/Retail Support Sector
3. Development of subsidy and pricing strategies for demand driven long-term behavioural change.
4. Sustainable models for entrepreneurial CHC businesses.

More information	Acknowledgements
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